

What is claimed is:

1 1. An autostereoscopic display supplying a viewer with a stereoscopic
2 image when viewed from an intended perspective, comprising:
3 a pixel array including individual pixels each having subpixel elements,
4 N individual pixels being arranged into an individual pixel groups, wherein N is
5 equal to the number of individual perspective images to be displayed, each
6 said pixel including plural subpixels extending in a horizontal direction from
7 the viewer's intended perspective and forming a part of an individual
8 perspective image;
9 a first lenticular array positioned vertically from the viewer's intended
10 perspective and focussing said subpixels of each said pixel to a single spatial
11 point between said pixel array and the viewer; each said pixel group in the
12 horizontal direction being focussed by a different first lens of said first
13 lenticular array; and
14 a second lenticular array positioned between said first lenticular array
15 and the viewer such that images projected from different pixels of each pixel
16 group are directed to a different location at an intended viewing point, the
17 spacing of the images from each pixel of said pixel groups being separated at
18 the intended viewing position at about the spacing between human eyes to
19 thereby display said plural images stereoscopically.

1 2. The display of claim 1 where N is two, a first individual perspective
2 being supplied to a left eye position while a second individual perspective is
3 supplied to a right eye position.

1 3. The display of claim 1 wherein N is greater than two.

1 4. The display of claim 1 wherein said plural subpixels of each said pixel
2 include a red subpixel, a green subpixel and a blue subpixel.

1 5. The display of claim 1 wherein said first lenticular array focuses said
2 subpixels to the surface of a lens of said second lenticular array.

1 6. The display of claim 1 wherein each of said first and second lenticular
2 arrays is formed of a plurality of cylindrical lenses.

1 7. The display of claim 6 wherein said cylindrical arrays of said first and
2 second lenticular arrays extend generally parallel to each other.

1 8. The display of claim 7 wherein said first and second lenticular arrays
2 are formed on the opposed sides of a single optical element.

1 9. An autostereoscopic display, comprising:
2 a pixel array including several pixel groups;
3 a first lenticular array positioned between the pixel array and a viewer,
4 said first lenticular array comprising a plurality of first lenses corresponding
5 respectively to the pixels of the pixel array such that such that the lenses of
6 said first array include a plurality of first lens groups corresponding to said
7 pixel groups; and
8 a second lenticular array positioned between the first lenticular array
9 and a viewer such that images projected from first lenses within each first lens
10 group pass through a corresponding one of several lenses within the second
11 lenticular array,
12 wherein a pitch of lenses within the second lenticular array differs from
13 a pitch of the first lens groups within the first lenticular array.

1 10. A display as recited in claim 9, wherein the pitch of the first lenses of
2 said first lenticular array is substantially the same as the pitch of the pixels of
3 said pixel groups.

1 11. A display as recited in claim 9, wherein the pitch of the lenses of said
2 second lenticular array is smaller than the pitch of the lenses of the first lens
3 groups.

1 12. A display as recited in claim 9, wherein said pixels are color pixels.

1 13. A display as in claim 12, wherein each of said color pixels comprises a
2 plurality of color components arranged in a first direction, and said first lenses
3 of said first array comprise cylindrical lenses having axes extending
4 perpendicular to said first direction.

1 14. A display as in claim 12, wherein each of said color pixels comprises a
2 plurality of color components arranged in a horizontal direction with respect to
3 the display, and said first lenses of said first array comprise cylindrical lenses
4 having axes extending vertically with respect to the display.

1 15. A display as recited in claim 9, wherein the images simultaneously
2 displayed by different pixels within each of several adjacent pixel groups
3 include different views of a single scene to enable a stereoscopic effect.

1 16. A display as recited in claim 9, wherein each lens within the second
2 lenticular array is offset from a corresponding first lens group within the first
3 lenticular array relative to an axis orthogonal to the first lenticular array, the
4 offset increasing based on a distance from the lens of the second array to a
5 center of the autostereoscopic display.

1 17. A display as recited in claim 9, wherein the first lenticular array is
2 separated from the pixel array by a first predetermined distance and said
3 second lenticular array is separated from the first lenticular array by a second
4 predetermined distance.

1 18. A display as recited in claim 9, wherein the first and second lenticular
2 arrays are retrofit to a display after the display is fabricated.

1 19. A method of displaying multidimensional images on an
2 autostereoscopic display, comprising:
3 generating images using a pixel array including several pixel groups;
4 projecting the images generated by each pixel through a corresponding
5 plurality of first lenses of a first lenticular array, thereby projecting the images
6 through several first lens groups;

7 further projecting the images projected through each first lens group
8 through a different and corresponding one of several second lenses within a
9 second lenticular array that is positioned between the first lenticular array and
10 a viewer, the further projecting involving projecting the images through second
11 lenses having a pitch that differs from a pitch of the first lens groups within the
12 first lenticular array.

1 20. A method as in claim 19, comprising generating images with color
2 pixels, each of said color pixels comprising a plurality of color components
3 arranged in a first direction, said first lenses of said first array comprising
4 cylindrical lenses having axes extending perpendicular to said first direction.

1 21. A method as recited in claim 19, wherein the generating images
2 comprises:

3 simultaneously displaying different views of a single scene on different
4 pixels within each of several adjacent pixel groups to enable a stereoscopic
5 effect.

1 22. A method as recited in claim 19, wherein the projecting comprises:
2 projecting the images through second lenses within the second
3 lenticular array that are each offset from corresponding pixel groups within the
4 pixel array and from first lens groups in the first lenticular array relative to an
5 axis orthogonal to the pixel array, the offset increasing based on a distance
6 from each particular second lens to a center of the pixel array.

1 23. A method as recited in claim 19, wherein the projecting comprises:
2 projecting the images through first lenses within the first lenticular array
3 that are separated from the pixel array by a first predetermined distance, and
4 projecting images from the first lenses within the first lenticular array through
5 second lenses in the second lenticular array that are spaced from the first
6 lenticular array by a second predetermined distance.

1 24. A method as recited by claim 19, further comprising retrofitting the first
2 and second lenticular arrays to an existing display having the pixel array.